

The following listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

Claims 1-4 (Cancelled)

Claim 5. (Currently Amended) An apparatus comprising a separation system or separation vessel (200) having a gas flow outlet line and a liquid phase outlet line, and having constituted by three different sections:

- a primary separator (1) for flows with a G/L in the range of 0.1 to 10 having a first gas/liquid inlet and a first outlet;
- a secondary separator (2) for flows with a G/L in the range of 10 to 50 having a second gas/liquid inlet and a second outlet;
- a system which limits the formation of a liquid vortex (3);

where G/L is the ratio of the gas to liquid mass flow rates.

Claim 5. 6. (Currently Amended) An apparatus according to claim 5, in which the dimensions of the separation vessel (200) and the position imposed on the normal level of liquid in separation vessel (200) are determined so as to impose a residence time in the range of 1 to 10 minutes, preferably close to 2 minutes; the separation vessel separator achieving a separation efficiency such that no more than 0.1 wt.% to 0.5 wt.% maximum (by weight) of liquid remains in the gas phase at the separator gas flow outlet line and no more than 0.5 wt.% to 1 wt.% maximum (by weight) of gas remains in the liquid phase at the separator liquid phase outlet line.

Claim 6. 7. (Currently Amended) An apparatus according to claim 5 or claim 6, in which the primary separator comprises is constituted by a tube terminated by said first outlet which has at least one tangential outlet, said tangential outlet causing the flow to rotate through 90° at the first tube outlet, the ratio of the area of the openings in each tangential outlet

and the area of the cross section of flow in the tube being in the range of 0.25 to 1, and the ratio between the height and width of each opening being in the range of 1 to 4.

**Claim 6. 8.** (Currently Amended) An apparatus according to claim any one of claims 5 to 7, in which, in the primary separator, a helix is added inside the tube upstream of said at least one the tangential outlet outlets, said helix being a single or double helix, the ratio of the helix width, corresponding to the cross section of flow of the fluids, to the tube diameter being generally in the range of 0.5 to 1, and the pitch number of the helix (i.e., the ratio of the total height to the helix pitch) generally being in the range of 1 to 6, and preferably in the range 2 to 3.

**Claim 7. 9.** (Claim Amended) An apparatus according to any one of claims claim 5 to 7, in which the secondary separator (2) further comprises is constituted by a cyclone with and said second gas/liquid inlet is a free tangential inlet (6), the free tangential inlet (6) having a rectangular cross section, and the ratio of the width to the length of this cross section being in the range of 0.2 to 0.6.

**Claim 8. 10.** (Amended) An apparatus according to any one of claims 5 to claim 9, in which, in the secondary separator, the ratio of the cross sectional area of the free tangential inlet to the cross sectional area of the cyclone (2) is generally in the range of 0.06 to 0.25, and said cyclone is in fluid communication with said gas flow outlet line (8) wherein the ratio of the diameter of the gas flow outlet line (8) to the cyclone diameter is generally in the range of 0.3 to 0.6, and the ratio of the height of the gas outlet line (8) to the cyclone diameter is in the range of 0 to 1.

**Claim 9. 11.** (Currently Amended) An apparatus according to claim 9 any one of claims 5 to 10 in which, in the secondary separator, the second outlet is a liquid outlet (7a) from the cyclone which is always below the liquid level in the separator vessel, the liquid outlet

from the cyclone having the same diameter as the cyclone and comprising 2 to 8 blades attached to the walls, distributed at a constant angular spacing ~~and being 2 to 8 in number~~, and the ratio of the width of said blades to the cyclone diameter being in the range of 0.15 to 1.

Claim ~~10.~~ 12. (Currently Amended) An apparatus according to ~~any one of claims claim~~ 5 to 11, in which the ~~said~~ system limiting the formation of a liquid vortex comprises ~~is composed of~~ blades attached to the walls located at a constant angular spacing to dissipate the angular movement, said blades being 2 to 8 in number, and the height of these blades being in the range between the maximum depth of the liquid and the bottom portion of the primary separator (1).

Claim ~~12.~~ 13. (Currently Amended) An apparatus according to ~~any one of claims claim~~ 5 to 12, in which a cylinder is added to the base of the separation vessel, in the axis of flow of the liquid phase outlet line, said cylinder having the same diameter as the liquid phase outlet line and a height in the range 0.5 to 2 diameters of the liquid phase outlet line, said cylinder having massive walls or is a wall constituted by a screen ~~and in this case being~~ closed at its upper portion.

14. (New) An apparatus according to claim 8, wherein the pitch number of the helix is in the range of 2 to 3.
15. (New) An apparatus according to claim 6, in which the primary separator comprises a tube terminated by said first outlet which has at least one tangential outlet, said tangential outlet causing the flow to rotate through 90° at the first outlet, the ratio of the area of the openings in each tangential outlet and the area of the cross section of flow in the tube being in the range of 0.25 to 1, and the ratio between the height and width of each opening being in the range of 1 to 4.

16. (New) An apparatus according to claim 6, in which the secondary separator (2) further comprises a cyclone and said second gas/liquid inlet is a free tangential inlet (6), the free tangential inlet (6) having a rectangular cross section, and the ratio of the width to the length of this cross section being in the range of 0.2 to 0.6.
17. (New) An apparatus according to claim 7, in which the secondary separator (2) further comprises a cyclone and said second gas/liquid inlet is a free tangential inlet (6), the free tangential inlet (6) having a rectangular cross section, and the ratio of the width to the length of this cross section being in the range of 0.2 to 0.6.
18. (New) An apparatus according to claim 8, in which the secondary separator (2) further comprises a cyclone and said second gas/liquid inlet is a free tangential inlet (6), the free tangential inlet (6) having a rectangular cross section, and the ratio of the width to the length of this cross section being in the range of 0.2 to 0.6.
19. (New) An apparatus according to claim 10 in which, in the secondary separator, the second outlet is a liquid outlet (7a) from the cyclone which is always below the liquid level in the separator vessel, the liquid outlet from the cyclone having the same diameter as the cyclone and comprising 2 to 8 blades attached to the walls, distributed at a constant angular spacing, and the ratio of the width of said blades to the cyclone diameter being in the range of 0.15 to 1.
20. (New) An apparatus according to claim 5, in which the system limiting the formation of a liquid vortex comprises blades attached to the walls located at a constant angular spacing to dissipate the angular movement, said blades being 2 to 8 in number, and the height of these blades being in the range between the maximum depth of the liquid and the bottom portion of the primary separator (1).

21. (New) An apparatus according to claim 5, in which a cylinder is added to the base of the separation vessel, in the axis of flow of the liquid phase outlet line, said cylinder having the same diameter as the liquid phase outlet line and a height in the range 0.5 to 2 diameters of the liquid phase outlet line, said cylinder having massive walls or is a wall constituted by a screen closed at its upper portion.